

**REMARKS/ARGUMENTS****Status of Application and Disposition of Claims**

The present Office Action addresses an old claim set and does not consider the amendments filed in the Preliminary Amendments of September 22, 2005, and December 8, 2006.

Applicant notes that the Examiner indicated that the present Office Action is responsive to a communication filed on "22 September 2006" [sic, 2005] and lists claims 1-22 as pending. Furthermore, the Examiner examined claims 1-22.

However, a first Preliminary Amendment was filed on September 22, 2005, which amended claims 4-10, 12, 13, 15, and 21 and cancelled claim 22. A second Preliminary Amendment was filed on December 8, 2006, which amended claims 1-15, 20 and 21 and added claims 23 and 24. Accordingly, the correct disposition of the claim is that claims 1-21 and 23-24 are pending.

Thus, the correct status of application should be that this Office Action is responsive to the communication filed on December 8, 2006, not September 22, 2005 as indicated by the Examiner. Moreover, the correct disposition of the claim is that claims 1-21 and 23-24 are pending, not claims 1-22 are pending as indicated by the Examiner.

While the present Office Action addresses an old claim set and does not consider the two sets of Preliminary Amendments that have been filed, Applicant will attempt to respond to the Office Action to the extent that it is possible. Applicant respectfully requests, however, that if another Office Action is issued, that Office Action not be made final so that Applicant may be afforded the benefit of non-final Office Action that examines a current claim set, including Claims 23 and 24.

**Claim Rejections – 35 U.S.C. §102**

Claims 1-6, 8-22 were rejected under 35 U.S.C. §102(b) as being anticipated by Yang et al. (US 7,046,361) ("Yang"). The body of the rejection, however, does not address Yang, but instead address Huang et al. (US 6,420,791) ("Huang"). Applicant will address both Huang and Yang for the sake of completeness and respectfully requests reconsideration and clarification if an additional Office Action is issued.

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The Examiner stated in the rejection that Figs. 1A-3B of Huang discloses an overlay mark with two mark portions, each mark portion comprising a "two dimensional generally orthogonal array of individual test structures". Applicant respectfully disagrees.

Huang is related to forming an alignment mark for aligning a silicon wafer to a corresponding mark on a photomask in conventional photo-exposure operations. See, col. 1, lines 18-21. Alignment marks include two types of marks; a zero mark and a non-zero mark. The zero mark is formed on a substrate and is configured to produce a diffraction pattern when a laser beam from a stepper is incident on the zero mark. See, col. 1, lines 21-26 and lines 40-43. A non-zero mark is used when the zero mark is no longer visible due to, e.g., a metal layer that is deposited over the wafer. See, col. 1, lines 58-63.

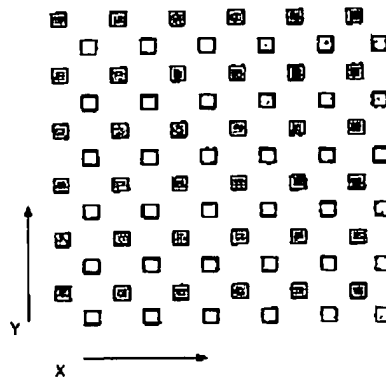
Huang is specifically directed to a "non-zero mark" that includes metal material 100 filling openings of a dielectric material that is over a metal plateau 102a, 102b, 102c, shown in Figs. 1A, 1B, and 1C, respectively. Col. 3, lines 11-14.

Independent claims 1 and 17, on the other hand, are related to an "overlay metrology mark for determining the relative position between two or more layers of an integrated circuit structure". Independent claim 18 is related to "a method for determining the relative position between two or more layers of an integrated circuit structure". The overlay metrology mark of claim 1 includes "a first mark portion associated with a first layer", which is a layer of the integrated circuit structure" and "a second mark portion associated with a second layer", which again is a layer of the integrated circuit structure. Claims 17 and 18 similarly recites "a first layer" and "a second layer" in the body of the claims. Thus, body of claims 1, 17, and 18 recites "layers" thereby breathing life into the preamble, which therefore must be given patentable weight.

The "alignment mark" of Huang is very different than the claimed overlay metrology mark. Huang's alignment mark is for aligning a photomask in a stepper with the silicon wafer. Huang's alignment mark is not for "determining the relative position between two or more layers of an integrated circuit structure".

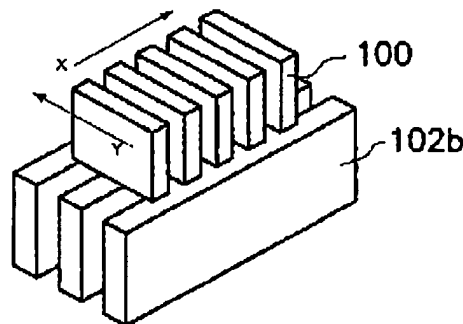
Additionally, claim 1 recites "wherein each mark portion comprises a two dimensional generally orthogonal array of individual test structures", and claims 17 and 18 similarly recite "a single two dimensional orthogonal array". For the sake of example and clarity, a modified version of Fig. 1a from the present application is reproduced below to illustrate an example of a two dimensional array.

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As illustrated by the arrows labeled "X" and "Y", the mark is an array in both the X direction and the Y direction, and therefore is "a two dimensional generally orthogonal array of individual test structures".

On the other hand, Huang discloses an alignment mark that includes metal material 100 filling the openings of a dielectric material to form only a one dimensional array. For the sake of reference, a modified version of Fig. 1B from Huang is reproduced below.



As illustrated by the arrows labeled "X" and "Y", the metal material 100 is an array along the X direction but not Y direction, while the material labeled 102b is an array along the Y direction but not the X direction. Accordingly, the metal material 100 and material 102b shown in Fig. 1B of Huang, as well as the remaining figures of Huang, are not each a "two dimensional generally orthogonal array of individual test structures" as recited in claim 1.

Thus, Applicants respectfully submit that independent claims 1, 17, and 18 are patentable over Huang.

Additionally, with respect to claim 18, Huang does not disclose "optically imaging the two mark portions". As discussed above, Huang discloses the use of a laser light source from a stepper to illuminate the alignment mark and detecting the diffraction pattern. Col. 1, lines 22-30. Huang additionally fails to disclose "digitizing the image" and "numerically analysing

the digitized data to obtain a quantified measurement of the misalignment of the first and second mark portions" as recited in claim 18.

With respect to Yang, which was cited by the Examiner in the rejection, Applicant notes that Yang discloses a target 700 in Fig. 23 that includes two separate two dimensional arrays 702 and 704, both of which include a top portion and a bottom portion. See, col. 19, lines 1-3. Amended claim 1, however, recites "wherein the overlay metrology mark does not include any additional mark portions". Amended claims 17 and 18 recite "wherein no additional mark portions are laid down". Thus, the claimed overlay marks include only the first mark portion and the second mark portion, whereas Yang requires a top portion and a bottom portion for a first array 702 and another top portion and a bottom portion for a second array 704. Thus, Applicants respectfully submit that claim 1 is patentable over Yang.

Reconsideration and withdrawal of this rejection is respectfully requested. Claims 2-6 and 8-16 depend from claim 1 and are, therefore, likewise patentable for at least the same reasons. Claims 19-21, 23 and 24 depend from claim 18 and are therefore also patentable for at least the same reasons.

Claim Rejections – 35 U.S.C. §103

Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over Huang. However, claim 7 depends from claim 1 and is, therefore, likewise patentable for at least the same reasons. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 1-21 and 23 and 24 remain pending, of which claims 1, 17 and 18 have been amended. For the above reasons, Applicants respectfully request allowance of all pending claims. Should the Examiner have any questions concerning this response, the Examiner is invited to call the undersigned at (408) 378-7777 ext 112.

**CERTIFICATE OF FACSIMILE TRANSMISSION**

I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office to the fax number 571-273-8300 on the below date.

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Respectfully submitted,



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